APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/369,031	08/04/1999	LEX S. OLORENSHAW	3188.01/1144	6238

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EXAMINER
KNEPPER, DAVID D

ART UNIT	PAPER NUMBER
2654	

DATE MAILED: 03/26/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

<table>
<tr>
<td colspan="2"></td>
<td>Application No.
09/369,031</td>
<td>Applicant(s)
OLORENSHAW ET AL.</td>
</tr>
<tr>
<td colspan="2" rowspan="2">Office Action Summary</td>
<td>Examiner
David D. Knepper</td>
<td>Art Unit
2654</td>
</tr>
</table>

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *8 January 2002 (#5)* .

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-50* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-50* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

    If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____ .

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

    a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .

4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: .

1.   Applicant's correspondence filed on 8 January 2003 (Paper #5) has been received and

considered. Claims 1-50 are pending.

Specification

2.   The specification is objected to because of improper incorporations by reference to 3

non-patent documents on pages 8, 10 and 13. The relevant information from these documents

must be inserted into the specification. They are over 10 years old (dated 1989 and 1982), and,

as such, are admitted prior art. The applicant is referred to section 609 of the MPEP which

discusses treatment of materials incorporated by reference.

Claims

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or
>
> described as set forth in section 102 of this title, if the differences between the subject
>
> matter sought to be patented and the prior art are such that the subject matter as a whole
>
> would have been obvious at the time the invention was made to a person having ordinary
>
> skill in the art to which said subject matter pertains. Patentability shall not be negatived
>
> by the manner in which the invention was made.

4.   Claims 1-50 are rejected under 35 U.S.C. § 103 as being unpatentable over Kao

(6,316,712) in view of Gillick (5,715,367).

"Speech processing" is taught by Kao's phonetic modeling using acoustic decision tree, title:

"speech data generated from one or more speech sources" (English has about 40 to 50 phones . . . phonetic models can be clustered to not just reduce the number of models but also increase the training robustness, co. 1, lines 8-32);

"an enhanced phone set that includes acoustic-phonetic symbols and connectors for extending said enhanced phone set" (his few examples in col. 2, lines 27-40, symbols and connectors are shown in columns 4-5 and columns 8-9 which show example symbols marking phone models and transitions between them -- some specific phones and interconnecting relationships are shown in Gillicks' figure 9);

"transcription generated by a transcription process that selects appropriate phones from said enhanced phone set to represent said speech data" (suggested by his use of symbols in col. 2, lines 30-40 – see unique transcription symbols used by Gillick in column 28-29).

Kao uses the term "transcription" in column 8, lines 44-46 indicating that the sequence of phones [are supervised] according to the transcription provided with the corpus. This includes inter-word context. Thus, he teaches that his models are used to recognize speech and this requires using the models to compare input speech and transcribe or otherwise phone symbols element by element to form words. Gillick shows some specific transcription symbols in columns 28-29. The process of "transcription" is considered equivalent to Gillicks' use of phonetic spelling, column 2, lines 37-55. Gillicks' phoneme-in-context represents the Markov Model used to represent inter-word context. It would have been obvious for a person having

ordinary skill in the pertinent art, at the time the invention was made, that "transcription" as claimed is obvious to affect recognition because this is the way linguists have prepared speech models such as those used by Kao and Gillick for speech recognition. Using symbols shown by Gillick in the system of Kao would have been obvious because Kao teaches that the use of such a corpus is well known to implement transcription.

It is noted that some of the specific categories and process symbols taught in the applicant's disclose (i.e. figures 8(a)-(b)) are not explicitly taught in the prior art of record. However, the applicant claims some broadly as "acoustic-phonetic symbols and connectors" and some of the representations are specifically taught or rendered obvious by Kao's classification examples in column 2, lines 30-40: "Nasalization" [applicant, figure 8(b)] = his nasal; "voicing" [Fig. 8(b)] = voiced/unvoiced; "Frication" [Fig. 8(b)] = fricative. Thus, the examples given by Kao show that it is obvious to utilize symbols not only for the phones but for other properties of the phones and how they interconnect. Further symbols are shown by Gillick in columns 28-29. It would have been inherent to use any of these symbols for transcription because the definition of "transcription" is the conversion of data from one language, code, medium to another, including reading, translating, and recording functions. Thus, the representations of these symbols as ink on paper is a transcription. The further details regarding decision trees and the training of models are for the purpose of further enhancing the otherwise well known phoneme transcriptions to create more accurate representations thereof to perform speech recognition. Modeling stress, for example, is taught in col. 9, lines 48-50 using separate models.

Claim 2: Using the phone dataset that includes said speech data is taught by the training and mapping functions of figure 3.

Claim 3: Use in a speech recognizer is the purpose of the models.

Claim 4, 7: Phonetic dictionary is taught with the use of various phones used to recognize speech (see column 3). Use of the TIMIT database is taught by Kao in col. 2, lines 49-67.

Claims 5, 6: Performing a "transformed phone dataset" is explicitly taught by Kao who clusters acoustically close triphones based on their context. The examples in column 2, indicate symbols representing similar sounding phones and the center phone of each triphone is therefore representative of the phone which an input sound corresponding thereto would be transcribed if properly recognized. A simple example would be recognizing a word with the letter (phone) $\underline{d}$. While the <u>dental placement</u> of this phoneme might be labeled $\underline{dh}$ (i.e. – as sounded in the word "drive"). This could be compared to a glottal stop version of $\underline{d}$ (i.e. – as sounded in the word "hard"). The transcription of both versions of the $\underline{d}$ phoneme would still be the letter "d". An explicit example of such a "transformation" can be found in Gillick who teaches that it would be obvious to utilize a look up table from PIC (phoneme-in-context) to PEL (phonetic element) <u>where speed is more important than memory storage</u> in col. 24, lines 48-50.

Claims 8, 20: These are obvious representations of phones. Most are taught by Kao in col. 2. The transcription symbols used by Gillick include R-coloring in col. 29, line 10-11. R-deletion is obvious in view of Gillick's inclusion of various "R" sound contexts.

Claims 9-19: The use of various symbols as transcription tools are obvious in view of the variety of text symbols used by Gillick. The applicant fails to teach any new, unobvious phonetic representation of speech. Choosing a particular character to represent old and well known representations of phone models fails to teach any unexpected result. Particular examples

of the prior art include using and underline symbol to indicate left or right context as well as the symbolic indications of triphones with and without silence. The triphones themselves indicate composite-phones and there use with silence indicate beginning and end points (for example, left-silence indicates beginning of a word and right-silence indicates the end).

Claims 21-24: Transformation rules are taught by the use of triphones. Triphones represent a phone as it is influenced by left and right phones. When a match is made, the transcription of the phone is the center of the triphone. This process is performing a transformation of the input speech into the matched phones to form matched words. Such a transformation (or mapping) is explained by Gillick in columns 5-6 where he clearly teaches that his transformation (mapping) uses a decision tree. The decision tree was formed based on classification of the speech sounds, given its phonetic context in the given word or words. The rules that Kao and Gillick use for classification define the transformation rules (mapping) that is performed allowing one or more phones to be transformed (mapped) to a proper match based on the contextual rules. The only difference seems to be the applicant's reliance on symbols. However, it would have been obvious to utilize the symbols Kao shows in column 2 and that Gillick shows in columns 28 and 29 (see claims 8, 20 above), or combinations thereof, to represent the sounds they represent.

Claims 25-50 are rejected under similar arguments as presented above.

Remarks

5.   The applicant's arguments that the prior art fails to teach or suggest "enhanced phone set that includes acoustic-phonetic symbols and connectors for extending said enhanced phone set"

is in error. Kao teaches in column 3, lines 5-7 that his corpus contains ...totally 34,629 utterances. The vocabulary size of the combined corpus is 16,165. The within word triphone count is 26,714. Because this combined corpus is larger than the TIMIT which has 5,222 utterances (col. 2, lines 53), this is considered enhanced. While Kao focuses on the ability to compute efficient models, it is clear that these models will allow the proper recognition and transcription of input speech into phones, words, sentences, etc. See, for example, column 8, lines 44-65 of Kao which indicates that most corpora transcriptions do not include inter-word pauses explicitly transcribed. Therefore, at the very least, his example grammar teaches an extended transcription symbol for handling a phone representing inter-word pauses and its connection with other phones and words.

More detailed explanations regarding claims 5 and 6 were added to the above rejection.

Not only was prior art applied, regarding claims 8 and 20, but an example was given. This argument indicates that the references were ignored by the applicant. Further explanation follows. Example symbols for transcription are shown in figure 2 of Kao as explained above and others are shown by Gillick in columns 28-29. Both references refer to the symbols as showing how speech features can be classified (Kao, column 2 - Gillick, column 11). Gillick also indicates various categories or acoustic-phonetic process elements that are well known such as r-color, labial, palatal, velar, nasal, glottal stop (see column 29 of Gillick) which correspond to details shown in the applicant's figures 8(a)-(b) (i.e. - claims 8, 20). Many individual phoneme symbols in Gillick show that they fit into multiple categories. Therefore, one of ordinary skill in the art would find it obvious to utilize some symbol to indicate the difference such as the various abbreviations used by Gillick in the second column (within his columns 28-29). It appears that

the applicant is attempting to get a patent by merely combining symbols representing known phonemes with symbols representing known classes of phonemes. The prior art clearly shows that the relationships are well known. Therefore, the applicant is not entitled to a patent because this would remove an obvious expression (i.e. – symbols) of these known relationships from the public where they are already well known for use in speech recognition. "R-coloring" is one of the simplest examples because it inherently requires the inclusion of more than one phoneme symbol to represent the "R" phoneme and the phoneme that it is affecting.

The disagreement about what the prior art teaches seems to be related to the applicant's use of symbols to represent speech. However, since the claims are directed towards "speech processing" the well known relationships between speech sounds and their representations as symbols must be taken into account. It is believed that the references utilized are sufficient to show that, in the context of speech recognition, it is well known to use combinations of symbols to represent sounds, sound classifications, and also combinations of sounds.

6.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing

date of this final action.

Prior Art

7.   Rowden ("Speech Processing") is cited to indicate the state of the art in 1992. Phonetic

transcription is shown on page 192 as done and provides an example from a common dictionary

which typically illustrates the combination of phonemes and other contextually significant

elements such as stress. This reference teaches that it is well known to utilize Markov models to

perform an accurate transcription of speech into recognized words. The 'DRAGON-DICTATE"

example on page 248 performs transcription of input speech into text. (The Gillick patent is an

improvement of this by Dragon Systems, Inc.).

8.   **Any response to this action should be mailed to:**

Box AF
Commissioner of Patents and Trademarks
Washington, D.C. 20231

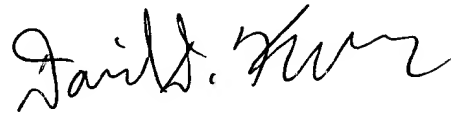**or faxed to:**

TC2600 Fax Center
(703) 872-9314

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington.
VA., Sixth Floor (Receptionist).

9.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to David D. Knepper whose telephone number is (703) 305-9644.

The examiner can normally be reached on Monday-Thursday from 07:30 a.m.-6:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marsha Banks-Harold, can be reached on (703) 305-4379.

Any inquiry of a general nature or relating to the status of this application should be directed to customer service whose telephone number is (703) 306-0377.

David D. Knepper
Primary Examiner
Art Unit 2654
March 20, 2003